

## Removing Uranium From Contaminated Steel Surfaces

### 2000 DOE student intern who assisted in research is among authors of published paper

Scientists from BNL's Environmental Sciences Department and Stony Brook University (SBU) Environmental & Molecular Sciences, have developed a simple, safe method of removing uranium from contaminated metallic surfaces using citric acid formulations so that the materials can be recycled or disposed of as low-level radioactive or nonradioactive waste. This research, published in the July 1, 2005 issue of *Environmental Science and Technology*, is funded by the Environmental Management Science Program of the Environmental Remediation Sciences Division, Office of Biological & Environmental Research of DOE's Office of Science.

Decontamination of radionuclides from metallic and other surfaces contaminated by radiological incidents is a major environmental challenge. A.J. Francis, assisted by Cleveland Dodge, BNL, and by SBU's Gary Halada, developed an innovative and improved process for decontaminating metal surfaces and other materials. Another team member named among the authors was BNL 2000 summer intern Jason McDonald, currently pursuing his Ph.D. at Louisiana State University. Material Science Department, both affiliated with the Center for The research team developed an environmentally friendly green-chemistry process that uses all naturally occurring materials — citric acid, common soil bacteria, and sunlight.



Discussing their uranium decontamination research conducted at BNL's National Synchrotron Light Source are scientists: (from left) A.J. Francis, BNL; Gary Halada, Stony Brook University; and Cleveland Dodge, BNL. Also participating in this research was Jason McDonald (not shown). McDonald worked with the research team at BNL in summer 2000 through a DOE summer internship program administered by BNL's Office of Educational Programs and is currently working on his Ph.D. in agronomy and environmental management at Louisiana State University, Baton Rouge.

Present methods of removing uranium from contaminated metal surfaces include sand blasting, chemical extraction, and electrochemical dissolution. These methods generate secondary waste streams, creating additional disposal problems. "In the event of a radiological incident, such as a 'dirty bomb,' this technology can be used to clean up contaminated materials," Francis said. "It will also treat the secondary waste generated from the treatment process, resulting in waste minimization. It is a comprehensive process."

For more information, see: A.J. Francis, C.J. Dodge, J.A. McDonald, and G.P. Halada, "Decontamination of Uranium-Contaminated Steel Surfaces by Hydroxycarboxylic Acid with Uranium Recovery," *Environ. Sci. Technol.*, **39**, 5015-5021 (2005).

— Kay Cordtz